**Grade Level: 6th Content: Multiplying/ dividing fractions/ decimals/Algebra**

**Outcomes/NGSSS: MA.6.A.1.1 Explain and justify procedures for multiplying and dividing fractions and decimals.**

**Goals/Objectives: Fractions and decimals - Explain the procedures for multiplying and dividing fractions.**

**Alternative outcomes/objectives: Use ratios and solve proportions. Combine math with practical knowledge to analyze a problem.**

**Prior Knowledge/Preskills: Items may require the student to apply mathematical knowledge described in the Standards from the lower grades. Identify decimals that are equivalent to commonly used fractions or mixed numbers. Identify decimals and/or fractions from a graphical representataion or a number line. Recognize the relationship between the place values. Identify the place value of a digit to the right of the decimal point. Identify a decimal, fraction, or mixed number between two numbers.**

**Materials: Measuring cup and spoon, sand, large mixing bowl, Feeding Frenzy Activity sheet, Feeding Frenzy Answer Key, pencil**

**Co-Teaching Model: Lead and support, multiple groups. Both teachers will participate in the instruction and follow up with students by rotating around the room and interact with student groups.**

**Motivation: Have students think if they have ever had to double, triple, or halve a recipe. Have students think about how they would adjust a recipe for more or fewer people.**

**Teacher-directed Instruction**

**Model of Instruction: Large Group Instruction**

**Lesson Procedures - Lesson Introduction**

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| **Content Teacher** | **Special Education Teacher** |
| **Begin by asking students if they cook at home.**  **Explain to students that most recipes tell how many people they will serve, but sometimes you may need to adjust the recipe if cooking for more or fewer people.** | **Call on a few students and ask them what they cook and if they follow the recipe. Then ask students if they have ever had to double, triple, or halve a recipe.** |

**Expectations:**

**1. Select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods.**

**2. Work flexibly with fractions, decimals, and percents to solve problems.**

**3. Develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use.**

**4. Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.**

**Rationale: Students will learn how to multiply and divide a recipe to feed groups of various sizes. They will use unit rates and proportions and think critically about real world applications of a baking problem.**

**Guiding Questions: Did you notice any shortcuts as you worked through the problems? Do you think the calculations would been easier if you gave your answer in decimals? Why do you think cooking measurements are made in fractions? What practical knowledge do you need to bake cookies? Is it enough to calculate the quantities of the ingredients?**

**Guided Practice: Cooperative Learning**

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| **Content Teacher** | **Special Education Teacher** |
| **Distribute the Feeding Frenzy activity sheet to each student. Explain to students that they will be looking at a recipe for chocolate chip cookies, and modifying it to feed different numbers of people. Before they begin working, let the students know they should give all the answers as fractions because that is how the ingredients are measured. Also, review the common abbreviations for measurements. Allow students to begin working in their cooperative groups on the activity sheet.** | **After a few minutes, bring the class together to discuss strategies used. Put an example of each strategy on the board as students contribute.** |

**-Closure**

**Independent Practice/Cooperative Practice: Active students Engagement Strategies**

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| **Content Teacher** | **Special Education Teacher** |
| **Now allow students time to work on the activity sheet individually, while circulating throughout the room to help where needed and informally check that all students are on the right track. Once students have finished, go over the answers as a class. Ask students what methods they used. Discuss as a class how the different methods all led to the same correct answers. Challenge students to have them consider why different methods can lead to the same answer. Encourage students to bring in real-world baking ideas and experiences into their answers.** | **Set up a work station where students can come up and use the manipulatives . As they work, encourage students to measure out the amount of the ingredient to check the reasonableness of their answers. Have the pre-measured amount of each ingredient in the front of the room for reference. This will help students visualize their answers and catch mistakes.** |

**Assessment**

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| **Content Teacher** | **Special Education Teacher** |
| **Give students another recipe and ask them to find the amount of each ingredient needed for a different number of servings.** | **Monitor students and provide alternative assessments for students with modifications. Allow student to respond verbally, reduce the number of items, and provide manipulatives for hands on demonstration of servings.** |

**Extensions:**

**1. Students could plan an entire dinner party for 12, complete with shopping list. Have students bring in recipes for the dishes they want to prepare, and then adjust all the recipes to serve 12.**

**2. Many recipe websites can automatically adjust a recipe to the desired number of servings. Have students explore these recipes, and then write about how the conversions they did in class compare to those on the websites.**

**3. Have students convert all the units to the simplest form for a particular ingredient.**

**4. Students could convert all measurements into grams and other metric units, which are standard baking units in Europe, and then multiply the recipe for 300 servings. How does the process compare using different units? Which units are easier to calculate? Which units are easier to use when baking?**

**Accommodations/Modifcations:**

**1. Time - Adapt the time allotted and allowed for learning, task, completion, and testing.**

**2. Input - Use visual aids, hands on activities, more concrete examples, and place students in cooperative groups.**

**3. Level of Support -Provide a peer buddy or teaching assistant.**

**4. Output - Allow students to give verbal response and to show knowledge with hands on materials.**

**5. Size - Reduce the number of items that must be learned.**

**Access Points:**

**Independent: MA.6.A.1.n.a Express and represent fractions, including halves, fourths, thirds, and eighths, using number names and numerals.**

**Supported: MA.6.A.1.Su.a Express, represent and use fractions, including halves, fourths, and thirds as parts of a whole and as parts of a set, using number names.**

**Participatory: MA.6.A.1.Pa.s Recognize part(half) of sets of objects.**

**References:**

**NCTM Illuminations: Feeding Frenzy Lesson Plan**